

1 **WHAT IS CLAIMED IS:**

2 1. An optical antenna system for a free-space communication system,
3 and the optical antenna system comprising

4 a fixed optical antenna assembly comprising

5 a single wavelength optical receiver assembly comprising

6 a first convex lens with a focal point; and

7 a single wavelength optical detector mounted at the
8 focal point of the first convex lens; and

9 a dual wavelength optical transmitter assembly comprising

10 a second convex lens with a focal point; and

11 a dual wavelength optical transmitter mounted at the

12 focal point of the second convex lens to produce a first and a second laser beam
13 with different wavelengths; and

14 an adjustable optical antenna assembly corresponding to the fixed
15 optical antenna assembly and comprising

16 a single wavelength optical transmitter assembly corresponding
17 to the single wavelength optical receiver assembly in the fixed optical antenna
18 assembly and comprising

19 a third convex lens with a focal point; and

20 a single wavelength optical transmitter mounted at the
21 focal point of the third convex lens; and

22 a dual wavelength optical receiver assembly corresponding to
23 the dual wavelength optical transmitter assembly and comprising

24 a fourth convex lens having a focal point; and

1 an optical splitter mounted at the focal point of the
2 fourth convex lens to reflect the first laser beam and being transparent to the
3 second laser beam;
4 an optical alignment detector mounted in a position
5 corresponding to the optical splitter to receive the reflected first laser beam and
6 to pass a received signal to an alignment controller in the free-space
7 communication system;
8 an optical alignment filter mounted between the optical
9 alignment detector and the optical splitter;
10 an optical data detector mounted in a position
11 corresponding to the optical splitter to receive the second laser beam and to pass
12 a received signal to a receiver amplifier in the free-space communication system;
13 and
14 a second optical filter mounted between the optical
15 data detector and the optical splitter.

16 2. The optical antenna system for a free-space communication system as
17 claimed in claim 1, wherein the optical data detector is separated from the optical
18 alignment detector by an angle of 90°.